



Research Article

EFFECT OF POLO (AN INSECTICIDE) ON PROTEIN CONTENTS OF LIVER AND GONADS OF FRESH WATER FISH, *LABEO ROHITA*

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ABSTRACT

An insecticide Polo has strong pesticidal activity in freshwater teleost fish *Labeo rohita* when exposed to acute exposure period (24 h to 96 h) for 1.2 ppm, 2 ppm, 3 ppm, 4 ppm and 5 ppm. The LC 50 value for 96 h was 1.9. The aim of this work is to evaluate lethal effects of an insecticide Polo on fresh water fish, *Labeo rohita*. Result showed reduction in protein level in liver and Gonads.

Keywords: Polo, Biochemical, *Labeo rohita*, liver, gonads.

INTRODUCTION

Pesticides are used in wide range for controlling the pest and yielding more crop production. These pesticides affect the non target organisms such as fish by entering in aquatic biota through agricultural runoff, spraying operations and rainfall. Fishes are the biomarkers of pesticidal pollution of aquatic bodies. Polo is the broad spectrum insecticide. It controls mites, aphids and jassids on cotton, vegetable nymphs and adults. Difenthiuron is thin invention relates to an insecticidal and miticidal composition which contains as active ingredients. Chlorfenapyr is present in combination with one or more chemicals. Difenthiuron is a pro-insecticide, which has first to be converted to its active form. The active compound then acts on a specific part of the energy producing enzymes in the mitochondria. This results in immediate paralysis of the pest after intake or contact with the product. Adjuvant is another component of insecticide Polo. It is a pharmacological or immunological agent that modifies the effect of other agent such as drug or vaccine. Adjuvants are obtained from South American tree *Quillaja saponaria*. The organisms are affected initially at cellular or even at molecular level and ultimately lead to physiological, pathological and biochemical disorders. Fresh water environment become increasingly polluted by industrial wastes and agricultural means through rain or flood. During the stress, organisms need sufficient energy to encounter the stress. The instant energy required is supplied from the reserved material which may be in the form of glycogen, protein and lipid. Biochemical study gives an idea about the accumulation of toxicants in the tissue of the organisms.

MATERIALS AND METHODS

The fishes *Labeo rohita* were collected from the Gadad and Girna River dam near Chalisgaon city, Dist. Jalgaon, Maharashtra, India. They were collected from their natural habitat and brought to the laboratory. The fishes were acclimatized to laboratory conditions for 10 days prior to subjecting them to experiments. Healthy and active fishes were chosen for experiments. Two groups of these fishes were formed. One group was considered as experimental group exposed to reagent grade of Polo for 24, 48, 72 and 96

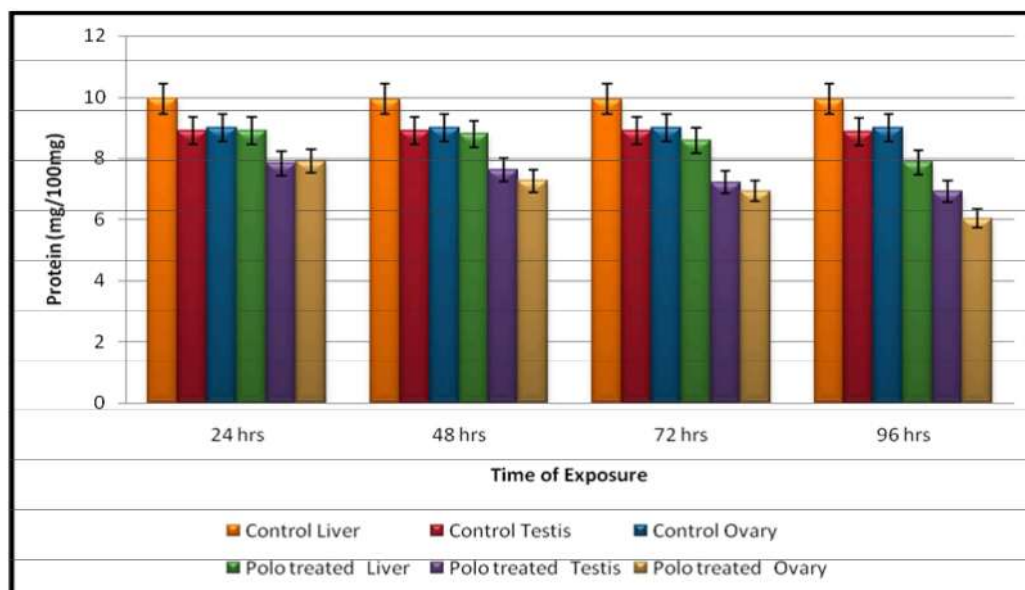
hours for 1.2 ppm, 2 ppm, 3 ppm, 4 ppm and 5 ppm exposure. Another group was without pollutants and was considered as control. Biochemical parameter was assessed in five individual animals, pesticide treated and control groups were made. The fishes were starved for one day prior to experimentation in order to avoid the metabolic differences if any due to differential feeding and food reserves. The protein is estimated from Liver and Gonads (Testis and Ovary) in control and experimental fishes. Total proteins were estimated by using Lowrey's method³. The amount of protein was calculated by referring to a standard graph value and it was expressed in terms of percentage in wet tissues. The Bovine serum albumen was used as a standard.

RESULTS AND DISCUSSION

The changes in biochemical composition of liver and gonads i.e. testis and ovaries of freshwater fish, *Labeo rohita*, exposed to acute treatment of pesticide Polo was studied along with experimental animals with respect to the percentage of protein in wet tissue. The percent decrease of protein in liver, after 96 h treatment with Polo was 8.9055 to 7.8665 %. The percent decrease of protein in testis of fish, *Labeo rohita* after 96 h treatment with Polo was 7.8343 to 6.9179 %. The percent decrease of protein in ovary of fish, *Labeo rohita* after 96 hours treatment with polo was 7.9083 to 6.0321. The depletion in protein content in the liver and gonads after pesticidal stress were shown in the graph. Today the whole aquatic biota had facing a major problem of toxic contamination. We must pay an attention towards this serious problem because physiological function of the aquatic organisms is affected by these toxicants directly or indirectly. It also causes biochemical dysfunctioning. These toxicants cause hyper activity which results in breakdown of food reserves to meet the energy demand. Protein serves as a source of energy for fish and it will be used for energy when insufficient energy is available from the other sources such as carbohydrates and lipids. Protein is an important organic constituent of animal tissue. It plays an important role in cellular metabolism. Protein regulates the process of interaction between intra and extra cellular media. The tissue protein level has a significant value, which may show

changes as per the biochemical condition of an organism. Protein is the most important constituent for growth, development and maintenance of life. Depletion of tissue protein content at acute exposure of pesticide Polo of freshwater fish *Labeo rohita*, suggest the possible utilization of protein for various metabolic purposes of enhanced property proteolysis to meet the high energy demand under pollution stress conditions. Total protein content decreased may be due to breakdown of proteins in the fabrication of some amount of energy for organism¹. The liver is much in proteins because of metabolic potential being oriented towards it and is the seat for the synthesis of various proteins besides being the regulating centre of metabolism⁶. Proteins are mainly involved in the architecture of the cell, which is chief source of nitrogenous metabolism and during chronic period of stress they are also a source of energy⁵. The depletion of protein fraction in various tissues may have been due to their degradation and possible utilization of degraded products for metabolic purposes¹². Depletion in the protein content in the gill and liver of *Nannostomus unifasciatus* exposed to the copper sulfate sub lethal concentrations¹³. When an animal is under toxic stress, diversification of

energy occurs to accomplish the impending energy demands and hence the protein level is depleted⁷. Decrease in protein level may be due to breakdown of protein into free amino acid under the effect of toxicant. It may also be due to their degradation. The decrease in protein level may also be due to their degradation studied in freshwater fish, *Labeo rohita* (Hamilton) exposed to malathion⁹. Depletion of protein was also observed at all exposure periods in freshwater fish *Catla catla* with reference to mercury chloride⁸. Under conditions of stress many organisms will mobilize proteins as an energy source via the oxidation of amino acids⁴. Decreased protein level may be attributed to stress mediated immobilization of these compounds to fulfill an increased element for energy by the fish to cope with environmental conditions exposed by the toxicant². The depletion in the total protein content may be due to augmented proteolysis and possible utilization of their product for metabolic purposes¹⁰. The reduced protein content studied in *L. rohita* due to the effect of an insecticide Encounter (Herbal plant extract) in all the tissues¹¹. The alteration in the tissue protein in the present study suggest disturbance in the physiological activity.



Graph: Variation in Protein content of liver and gonads of freshwater fish, *Labeo rohita* after acute exposure to an insecticide Polo

Summary

There is alteration in biochemical reserves of liver and gonads of the fresh water fish, *Labeo rohita*. Depletion of protein occurs after pesticidal exposure shows greater tendency for accumulation of pesticide Polo in the body of fresh water fish *Labeo rohita*.

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